

Water Quality Factors

Cities and Towns

Cities and towns contribute nonpoint source pollutants. This is sometimes called “urban runoff.” Most street drains flow through pipes directly into streams or lakes—rainwater (storm water) is NOT treated!

Common pollutants found in urban runoff are:

- sediments from bare soils
- bacteria from wastes
- nutrients from fertilizers
- oil from parking lots
- gasoline
- metals
- antifreeze and grease
- pesticides
- trash, including dog feces



Impervious cover refers to parts of the landscape that cannot absorb water the way soil and vegetation do. Concrete, asphalt roads, and rooftops all create impervious cover. They increase the flow of water to streams, lakes and rivers.

Illegal dumping of trash along roads pollutes runoff.



Accidents and spills along highways and roads may be infrequent but can cause concentrated pollutants to enter the watershed in a short amount of time.

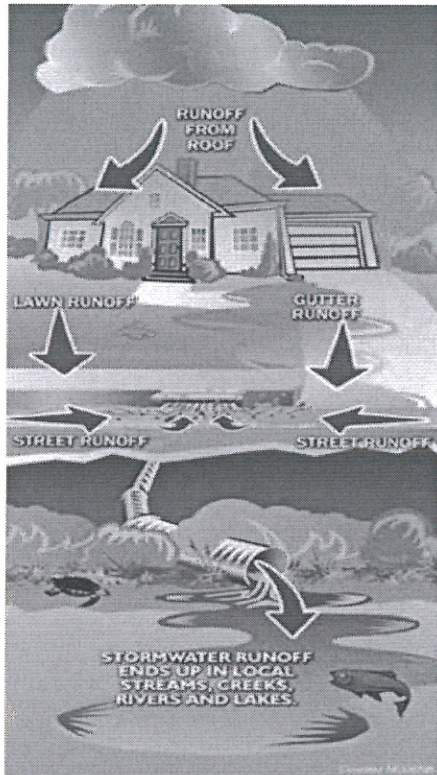
Non-point source pollution sites are much harder to discover and trace. This makes them harder to regulate and monitor.

Non-point source pollution is corrected by:

- preventing the pollution in the first place
- keeping the pollutants from reaching streams and rivers

Water Quality Factors

Residential Runoff



Impervious cover means parts of the landscape that cannot absorb water as well as soil and vegetation. Concrete, asphalt, and rooftops all create impervious cover. They increase the flow of water to streams, lakes and rivers.

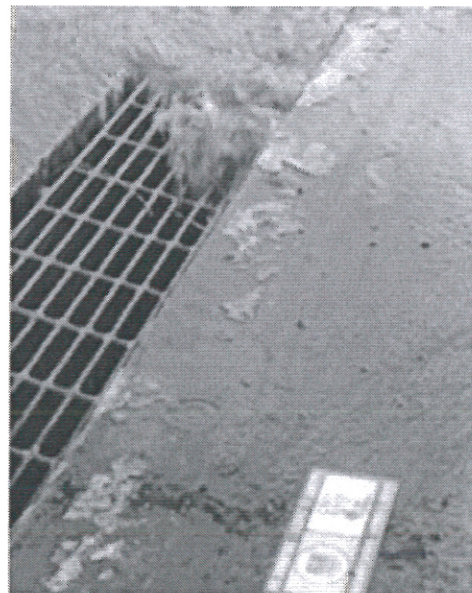
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Subdivisions and residential areas contribute nonpoint source pollutants. This is sometimes called “residential runoff.” This runoff is NOT treated and goes through sewers directly into streams, rivers, and lakes. Common pollutants found in residential runoff are:

- lawn fertilizers
- sediments
- bacteria from pet wastes
- oil drained from cars
- septic tank overflows
- gasoline
- detergents used to wash cars
- antifreeze and grease
- pesticides
- trash



Water Quality Factors

Industrial Pollution

Industrial pollution sites are often thought of when people think of pollution. Industrial facilities are considered point sources of pollution. They can contribute numerous types of toxic substances, chemicals and products (depending on the type of industry).

Oil and gas facilities can be sources of pollution if they leak these products into the groundwater.

Effects of industrial pollution can include:

- color changes
- excessive algae
- odors
- absence of aquatic life
- fish kills
- elevated BOD (Biological Oxygen Demand)
- sewage fungus



The United States Environmental Protection Agency (EPA) and state environmental quality agencies are responsible for regulating point source pollution and how to treat it.

Point source pollution is relatively easy to find and trace—all you do is find the pipe. It is usually corrected by removing the pollution from the water before it leaves the pipe.

Water Quality Factors

Wastewater Treatment Plants

Municipal wastewater treatment plants are considered point sources of pollution. These facilities can release:

- nutrients
- bacteria
- sediments

The effects of these pollutants include:

- excess algae (algal blooms)
- white foam
- sludge deposits (brown or gray solids)
- absence of fish and insects

- variable DO levels
- high BOD
- sewage fungus

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Water Quality Factors

Construction

Construction sites are considered non-point sources of pollution. These sources are hard to detect. These areas can cause high levels of sediments to reach waterways, as well as nutrients from fertilizers applied to new lawns and landscaping.

Sediments such as soil, clay and silt are a problem. They settle on aquatic plants and reduce the sunlight they can absorb. This reduces photosynthesis, which in turn reduces the oxygen available to animal life.

Sediments can cover nesting sites as well. They cause water to turn brown and muddy, and they increase turbidity.

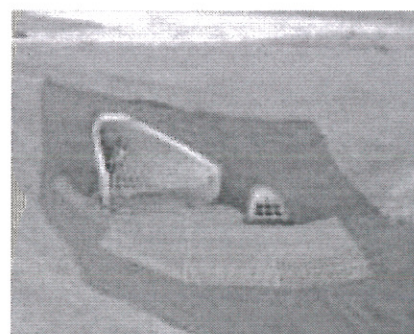
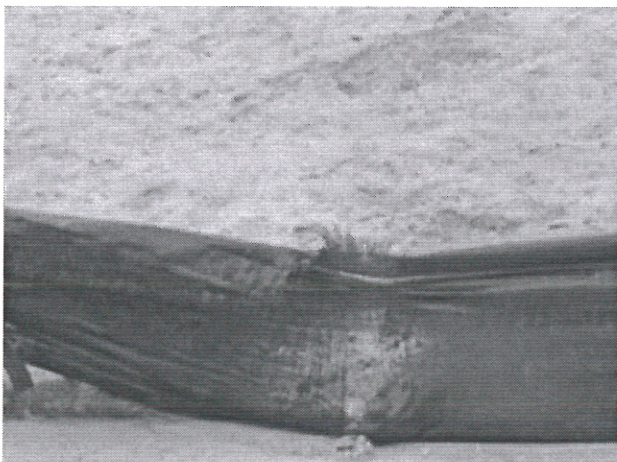
Construction workers are required by law to install erosion control devices and equipment. These include black cloth fencing to slow sediment, and sand bags and barriers in storm drains to slow runoff.



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Agriculture



Crops, feedlots, and pastures can degrade water quality and are considered non-point source pollution sites. They come from many sources that are hard to detect. These sites can be a source of runoff that includes:

- fertilizers from crops
- sediments eroding from bare soils
- elevated bacteria from animal wastes
- ammonia
- pesticides, insecticides and herbicides



Livestock can overgraze, creating very short grass. This holds back less runoff than longer grasses.

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Pollutant Information Sheet

Sediments

Particles of soils, sand, silt, clay, and minerals wash from land and paved areas into creeks and tributaries. In large unnatural quantities, these natural materials can be considered pollutants. Construction projects often contribute large amounts of sediment. Certain lumbering practices affect sediments in runoff. Sediments may fill stream channels and harbors that later require dredging. Sediments suffocate fish and shellfish populations by covering fish nests and clogging the gills of bottom fish and shellfish.

Petroleum Products

Oil and other petroleum products such as gasoline and kerosene can find their way into water from ships, oil-drilling rigs, oil refineries, automobile service stations, and streets. Oil spills kill aquatic life (fish, birds, shellfish, and vegetation). Birds are unable to fly when oil loads their feathers. Shellfish and small fish are poisoned. If it is washed on the beach, the oil requires much labor to clean up. Fuel oil, gasoline, and kerosene may leak into ground water through damaged underground storage tanks.

Human and Animal Waste

Human waste that is not properly treated at a waste treatment plant and then released into water may contain harmful bacteria and viruses. Typhoid fever, polio, cholera, dysentery, hepatitis, flu, and common cold germs are examples of diseases caused by bacteria and viruses in contaminated water. The main source of this problem is sewage getting into the water. People can come into contact with these microorganisms by drinking the polluted water or through swimming, fishing, or eating shellfish living in polluted waters. Often unexpected flooding of barnyards or stock pens can suddenly increase the toxic effects of animal waste in water. Animal waste can also act as a fertilizer and create damage by increasing nutrients. (See Detergents and Fertilizers.)

Organic Waste

Domestic sewage treatment plants, food-processing plants, paper mill plants, and leather tanning factories release organic wastes that bacteria consume. If too much waste is released, the bacterial populations increase and use up the oxygen in the water. Fish die if too much oxygen is consumed by decomposing organic matter.

Inorganic Chemicals

Inorganic chemicals and mineral substances, solid matter, and metal salts commonly dissolve in water. They often come from mining and manufacturing industries, oil field operations, agriculture, and natural sources. Those chemicals interfere with natural stream purification; they destroy fish and other aquatic life. They also corrode expensive water treatment equipment and increase the cost of boat maintenance.

Detergents and Fertilizers

Many of these substances are toxic to fish and harmful to humans. They cause taste and odor problems and often cannot be treated effectively. Some are very poisonous at low concentrations. The major source of pollution from agriculture comes from surplus fertilizers in the runoff. Fertilizers contain nitrogen and phosphorous that can cause large amounts of algae to grow. The large algae blooms cover the water's surface. The algae die after they have used all of the nutrients. Once dead, they sink to the bottom where bacteria feed on them. The bacterial populations increase and use up most of the oxygen in the water. Once the free oxygen is gone, many aquatic animals die. This process is called "eutrophication."

Heated or Cooled Water

Heat reduces the ability of water to dissolve oxygen. Electric power plants use large quantities of water in their steam turbines. The heated water is often returned to streams, lagoons, or reservoirs. With less oxygen in the water, fish and other aquatic life can be harmed. Water temperatures that are much lower than normal can cause habitat damage. Deep dams often let extra water flow downstream. When the water comes from the bottom of the dam, it is much colder than normal.

Acidic Precipitation

Aquatic animals and plants are adjusted to a rather narrow range of pH levels. When water becomes too acidic because of inorganic chemical pollution or from acidic rain, fish and other organisms die.

Pesticides, Herbicides, and Fungicides

Chemicals that are designed to limit the growth of or to kill life forms are a common form of pollution. This pollution results from the attempts to limit the negative effects of undesirable species on agricultural crop production. Irrigation, ground-water flow, and natural runoff bring such toxic substances to rivers, streams, lakes, and oceans.